Week 1 Practice Questions

Check and correct your answers using the solutions provided.

1. Expand and simplify

   (a) $(2x + 3)(2x - 1)$ 　　　 (b) $(a + 3)^2$ 　　　 (c) $4x(3x - 2) - x(2x + 5)$

2. Factorise

   (a) $x^2 - 7x$ 　　 (b) $y^2 - 64$ 　　 (c) $2x^2 + 5x - 3$ 　　 (d) $6t^2 - 13t + 5$

3. Simplify

   (a) $\dfrac{4x^3 y}{8x^2 y^3}$ 　　 (b) $\dfrac{3x + 2}{3} + \dfrac{4x - 1}{6}$

4. Solve the following equations

   (a) $\dfrac{h - 1}{4} + \dfrac{3h}{5} = 4$ 　　 (b) $x^2 - 8x = 0$ 　　 (c) $p^2 + 4p = 12$

5. Write each of the following as single powers of x and / y

   (a) $\dfrac{1}{x^4}$ 　　 (b) $(x^2 y)^3$ 　　 (c) $\dfrac{x^5}{x^{-2}}$

6. Work out the values of the following, giving your answers as fractions

   (a) 4^{-2} 　　 (b) 10^0 　　 (c) $\left(\dfrac{8}{27}\right)^{\frac{1}{3}}$

7. Solve the simultaneous equations

   $$3x - 5y = -11$$
   $$5x - 2y = 7$$

8. Rearrange the following equations to make x the subject

   (a) $v^2 = u^2 + 2ax$ 　　 (b) $V = \dfrac{1}{3}\pi x^2 h$ 　　 (c) $y = \dfrac{x + 2}{x + 1}$

9. Solve $5x^2 - x - 1 = 0$ giving your solutions in surd form.

Solutions

1) a) $4x^2 + 4x - 3$ b) $a^2 + 6a + 9$ c) $10x^2 - 13x$

2) a) $x(x - 7)$ b) $(y + 8)(y - 8)$ c) $(2x - 1)(x + 3)$ (d) $(3t - 5)(2t - 1)$

3) a) $\dfrac{x}{2y^2}$ b) $\dfrac{10x + 3}{6}$

4) a) $h = 5$ b) $x = 0$ or $x = 8$ c) $p = -6$ or $p = 2$

5) a) x^{-4} b) $x^6 y^3$ c) x^7

6) a) $\dfrac{1}{16}$ b) 1 c) $\dfrac{2}{3}$

7) $x = 3, y = 4$

8) a) $x = \dfrac{v^2 - u^2}{2a}$ b) $x = \sqrt{\dfrac{3V}{\pi h}}$ c) $x = \dfrac{2 - y}{y - 1}$

9) $x = \dfrac{1 \pm \sqrt{21}}{10}$